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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/881,167

06/14/2001

Richard A. Skogman

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09/05/2002

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EXAMINER

AL-NAZER, LEITH A

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 09/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/881,167

Applicant(s)

SKOGMAN, RICHARD A.

Examiner

Leith A Al-Nazer

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.


- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.


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Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- ☐ Interview Summary (PTO-413) Paper No(s). ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other:

DETAILED ACTION

Double Patenting

1. Applicant is advised that should claims 10 and 24 be found allowable, claims 11, 12, 25, and 26 will be rejected under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to reject the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 4, 5, 13-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites the limitation "alternating layers of pairs of aluminum gallium arsenide layers." This term is vague and indefinite.

Claim 13 recites the limitation "said device" in the first line of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 14 recites the limitation "a laser resulting from the method of claim 1." This term is vague and indefinite and fails to provide any structural limitations to properly conform the laser structure.

Claim 15 recites the elements “a substrate,” “a dielectric mirror,” and “an implanted region.” However, the claim fails to provide any structural connections to properly conform the laser structure.

Claim 18 recites the limitation “alternating layers of pairs of aluminum gallium layers.” This term is vague and indefinite.

Claim 28 recites the limitation “said semiconductor Distributed Bragg Reflector stack” in the first line of the last paragraph of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-5, 13, 15-19, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Olbright et al ‘447.

With respect to claims 1 and 15, Olbright shows a laser comprising a substrate comprising epitaxial layers and an aperture area (Figure 3; Column 4, Lines 55-65), a dielectric mirror formed on top of the aperture area (Column 3, Lines 10-20), an implanted region (343’) within the substrate (Figure 11), the implanted region bordering the aperture area. Claim 1 recites method steps for manufacturing the vertical cavity surface-emitting laser device of

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independent claims 15, 28, and 32. Such method steps are inherent as a product by process from the apparatus provided by Olbright.

With respect to claims 2 and 16, Olbright shows the epitaxial layers comprising a bottom semiconductor DBR stack (345 of Figure 11), an active region (343 of Figure 11), and a top semiconductor DBR stack (341 of Figure 11).

With respect to claims 3 and 17, Olbright teaches the top semiconductor DBR stack containing a material chosen from the group consisting of aluminum, gallium, arsenic, indium, phosphorus, and a combination thereof (Column 4, Lines 1-10).

With respect to claims 4 and 18, Olbright teaches alternating pairs of aluminum gallium layers (Column 4, Lines 1-10).

With respect to claims 5 and 19, Olbright teaches the top semiconductor DBR stack being doped (Column 4, Lines 1-10).

With respect to claims 13 and 27, Olbright teaches the device as a vertical cavity surface-emitting laser (Column 2, Lines 3-10).

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

7. Claims 28-32 are rejected under 35 U.S.C. 102(a) as being anticipated by Floyd '944.

With respect to claim 28, Floyd teaches a vertical cavity surface emitting laser comprises a substrate (102 of Figure 1), a bottom semiconductor DBR stack (104), an active region (108), a

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top semiconductor DBR stack (130), a dielectric mirror (140) positioned on the top semiconductor DBR stack over the aperture (128) of the active region (108), wherein the bottom semiconductor DBR stack comprises more epitaxial layers than the top semiconductor DBR stack (Column 3, Lines 15-25; Column 5, Lines 7-15).

With respect to claim 29, Floyd teaches 30 to 40 pairs of layers for the bottom semiconductor DBR stack (Column 3, Lines 15-25) and six alternating layers for the top semiconductor DBR stack (Column 5, Lines 7-15). Six layers is less than 5% of 40 pairs of layers.

With respect to claim 30, Floyd suggests using six layers for the top semiconductor DBR stack (Column 5, Lines 7-15). Claim 30 requires the top semiconductor DBR stack to have about four layers. It is inherent from Floyd's disclosure that one could use any even number of alternating layers.

With respect to claim 31, Floyd teaches the bottom semiconductor DBR stack and the top semiconductor DBR stack have certain reflectivities and the reflectivity of the bottom DBR stack is higher than the reflectivity of the top DBR stack (Column 3, Lines 14-20; Column 5, Lines 15-18).

With respect to claim 32, Floyd teaches a vertical cavity surface emitting laser comprises a substrate (102 of Figure 1), a bottom semiconductor DBR stack (104), an active region (108), a top semiconductor DBR stack (130), an implanted/confinement region (126) within the substrate and bordering the aperture area, a dielectric mirror (140) positioned on the top semiconductor DBR stack over the aperture (128) of the active region (108), wherein the bottom semiconductor

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DBR stack comprises more epitaxial layers than the top semiconductor DBR stack (Column 3, Lines 15-25; Column 5, Lines 7-15).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 6-12 and 20-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olbright et al '447 in view of Floyd.

Claim 15 and 16 are applied as above. With respect to claims 6-9 and 20-23, Floyd teaches a top semiconductor DBR stack having forty individual layers or less, twenty individual layers or less, eleven individual layers or less, and seven individual layers or less (Column 5, Lines 7-15). Olbright and Floyd are analogous art because they are from a similar problem solving area: semiconductor laser structures. At the time of the invention, it would have been

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obvious to a person of ordinary skill in the art to combine the top semiconductor DBR stack taught by Floyd with the laser structure taught by Olbright. The motivation for doing so would have been to reduce the resistance of the top semiconductor DBR mirror. Therefore, it would have been obvious to combine Floyd with Olbright to obtain the invention as specified in claims 6-9 and 20-23.

Claim 15 is applied as above. With respect to claims 10-12 and 24-26, Floyd teaches a dielectric mirror containing material chosen from the group consisting of silicon dioxide, titanium dioxide, silicon nitride, and combinations thereof (Column 5, Lines 7-15). Olbright and Floyd are analogous art because they are from a similar problem solving area: semiconductor laser structures. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the materials taught by Floyd with the laser structure taught by Olbright. The motivation for doing so would have been to provide a top semiconductor DBR stack with less resistance. Therefore, it would have been obvious to combine Floyd with Olbright to obtain the invention as specified in claims 10-12 and 24-26.

Communication Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leith A Al-Nazer whose telephone number is 703-305-2717. The examiner can normally be reached on Monday-Friday 7:30am-4:00pm.

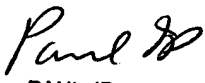
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on 703-308-3098. The fax phone numbers for the

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organization where this application or proceeding is assigned are 703-308-7724 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3329.

LA
September 3, 2002


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